



SEQUENCE LISTING

(1) GENERAL INFORMATION:

- (i) APPLICANT: GUERIN-MARCHAND, Claudine
DRUILHE, Pierre
- (ii) TITLE OF INVENTION: PEPTIDE SEQUENCES SPECIFIC FOR THE
HEPATIC STAGES OF P. FALCIPARUM BEARING EPITOPES CAPABLE
OF STIMULATING THE T LYMPHOCYTES
- (iii) NUMBER OF SEQUENCES: 46
- (iv) CORRESPONDENCE ADDRESS:
 - (A) ADDRESSEE: Burns, Doane, Swecker & Mathis
 - (B) STREET: P.O. Box 1404
 - (C) CITY: Alexandria
 - (D) STATE: Virginia
 - (E) COUNTRY: United States
 - (F) ZIP: 22313-1404
- (v) COMPUTER READABLE FORM:
 - (A) MEDIUM TYPE: Floppy disk
 - (B) COMPUTER: IBM PC compatible
 - (C) OPERATING SYSTEM: PC-DOS/MS-DOS
 - (D) SOFTWARE: PatentIn Release #1.0, Version #1.30
- (vi) CURRENT APPLICATION DATA:
 - (A) APPLICATION NUMBER: US 08/098,327
 - (B) FILING DATE: 24-NOV-1993
 - (C) CLASSIFICATION:
- (vii) PRIOR APPLICATION DATA:
 - (A) APPLICATION NUMBER: FR 91 01286
 - (B) FILING DATE: 05-FEB-1991
- (viii) ATTORNEY/AGENT INFORMATION:
 - (A) NAME: McGowan, Malcolm K.
 - (B) REGISTRATION NUMBER: 39,300
 - (C) REFERENCE/DOCKET NUMBER: 010830-045
- (ix) TELECOMMUNICATION INFORMATION:
 - (A) TELEPHONE: (703) 836-6620
 - (B) TELEFAX: (703) 836-2021

(2) INFORMATION FOR SEQ ID NO:1:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 17 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 8
- (D) OTHER INFORMATION: /note= "Amino Acid 8 wherein Xaa is Glu or Gly."

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

Leu Ala Lys Glu Lys Leu Gln Xaa Gln Gln Ser Asp Leu Glu Gln Glu
 1 5 10 15

Arg

(2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 1
- (D) OTHER INFORMATION: /note= "Amino Acid 1 wherein Xaa is Ser or Arg."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 6
- (D) OTHER INFORMATION: /note= "Amino Acid 6 wherein Xaa is Glu or Asp."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 8
- (D) OTHER INFORMATION: /note= "Amino Acid 8 wherein Xaa is Arg or Leu."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 15
- (D) OTHER INFORMATION: /note= "Amino Acid 15 wherein Xaa is Glu or Gly."

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

(2) INFORMATION FOR SEQ ID NO:3:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 17 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ix) FEATURE:

- (A) NAME/KEY: Peptide
(B) LOCATION: 2
(D) OTHER INFORMATION: /note= "Amino Acid 2 wherein Xaa is Ser or Arg."

(A) NAME/KEY: Peptide
(B) LOCATION: 7
(D) OTHER INFORMATION: /note= "Amino Acid 7 wherein Xaa is
Glu or Asp."

(A) NAME/KEY: Peptide
(B) LOCATION: 9
(D) OTHER INFORMATION: /note= "Amino Acid 9 wherein Xaa is Arg or Leu."

(A) NAME/KEY: Peptide
(B) LOCATION: 16
(D) OTHER INFORMATION: /note= "Amino Acid 16 wherein Xaa
is Glu or Gly."

(H) DOCUMENT NUMBER: WO 92/13884
(J) PUBLICATION DATE: 20-AUG-1992

Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu Gln Xaa
1 5 10 15

(2) INFORMATION FOR SEQ ID NO:4:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 17 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 3

(D) OTHER INFORMATION: /note= "Amino Acid 3 wherein Xaa is Ser or Arg."

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 8

(D) OTHER INFORMATION: /note= "Amino Acid 8 wherein Xaa is Glu or Asp."

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 10

(D) OTHER INFORMATION: /note= "Amino Acid 10 wherein Xaa is Arg or Leu."

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 17

(D) OTHER INFORMATION: /note= "Amino Acid 17 wherein Xaa is Glu or Gly."

(x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Gln | Xaa | Asp | Leu | Glu | Gln | Xaa | Arg | Xaa | Ala | Lys | Glu | Lys | Leu | Gln |
| 1 | | | | 5 | | | | 10 | | | | | | 15 | |

Xaa

(2) INFORMATION FOR SEQ ID NO:5:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 17 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 1

(D) OTHER INFORMATION: /note= "Amino Acid 1 wherein Xaa is Glu or Gly."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 4
- (D) OTHER INFORMATION: /note= "Amino Acid 4 wherein Xaa is Ser or Arg."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 9
- (D) OTHER INFORMATION: /note= "Amino Acid 9 wherein Xaa is Glu or Asp."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 11
- (D) OTHER INFORMATION: /note= "Amino Acid 11 wherein Xaa is Arg or Leu."

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu
 1 5 10 15

Gln

(2) INFORMATION FOR SEQ ID NO:6:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 2
- (D) OTHER INFORMATION: /note= "Amino Acid 2 wherein Xaa is Glu or Gly."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 5
- (D) OTHER INFORMATION: /note= "Amino Acid 5 wherein Xaa is Ser or Arg."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 10
- (D) OTHER INFORMATION: /note= "Amino Acid 10 wherein Xaa is Glu or Asp."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 12
- (D) OTHER INFORMATION: /note= "Amino Acid 12 wherein Xaa is Arg or Leu."

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

Gln Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys
 1 5 10 15

Leu

(2) INFORMATION FOR SEQ ID NO:7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 3
- (D) OTHER INFORMATION: /note= "Amino Acid 3 wherein Xaa is Glu or Gly."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 6
- (D) OTHER INFORMATION: /note= "Amino Acid 6 wherein Xaa is Ser or Arg."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 11
- (D) OTHER INFORMATION: /note= "Amino Acid 11 wherein Xaa is Glu or Asp."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 13
- (D) OTHER INFORMATION: /note= "Amino Acid 13 wherein Xaa is Arg or Leu."

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

(2) INFORMATION FOR SEO ID NO:8:

- (ii) MOLECULE TYPE: peptide

- ```
(ix) FEATURE:
 (A) NAME/KEY: Peptide
 (B) LOCATION: 7
 (D) OTHER INFORMATION: /note= "Amino Acid 7 wherein Xaa is
 Ser or Arg."
```

- ```
(ix) FEATURE:
      (A) NAME/KEY: Peptide
      (B) LOCATION: 12
      (D) OTHER INFORMATION: /note= "Amino Acid 12 wherein Xaa
          is Glu or Asp."
```

- ```
(ix) FEATURE:
 (A) NAME/KEY: Peptide
 (B) LOCATION: 14
 (D) OTHER INFORMATION: /note= "Amino Acid 14 wherein Xaa
 is Arg or Leu."
```

- (X) PUBLICATION INFORMATION:  
(H) DOCUMENT NUMBER: WO 92/13884  
(J) PUBLICATION DATE: 20-AUG-1992

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Lys Leu Gln Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa Ala Lys  
1 5 10 15

Glu

- (2) INFORMATION FOR SEQ ID NO:9:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 17 amino acids  
 (B) TYPE: amino acid  
 (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 5

(D) OTHER INFORMATION: /note= "Amino Acid 5 wherein Xaa is Glu or Gly."

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 8

(D) OTHER INFORMATION: /note= "Amino Acid 8 wherein Xaa is Ser or Arg."

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 13

(D) OTHER INFORMATION: /note= "Amino Acid 13 wherein Xaa is Glu or Asp."

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 15

(D) OTHER INFORMATION: /note= "Amino Acid 15 wherein Xaa is Arg or Leu."

(x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Lys | Leu | Gln | Xaa | Gln | Gln | Xaa | Asp | Leu | Glu | Gln | Xaa | Arg | Xaa | Ala |
| 1   |     |     | 5   |     |     |     |     | 10  |     |     |     |     |     | 15  |     |

Lys

(2) INFORMATION FOR SEQ ID NO:10:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 17 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 6

(D) OTHER INFORMATION: /note= "Amino Acid 6 wherein Xaa is Glu or Gly."

(ix) FEATURE:



- (A) NAME/KEY: Peptide
- (B) LOCATION: 9
- (D) OTHER INFORMATION: /note= "Amino Acid 9 wherein Xaa is Ser or Arg."

## (ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 14
- (D) OTHER INFORMATION: /note= "Amino Acid 14 wherein Xaa is Glu or Asp."

## (ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 16
- (D) OTHER INFORMATION: /note= "Amino Acid 16 wherein Xaa is Arg or Leu."

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

Lys Glu Lys Leu Gln Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg Xaa  
 1                      5                      10                      15

Ala

## (2) INFORMATION FOR SEQ ID NO:11:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: peptide

## (ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 7
- (D) OTHER INFORMATION: /note= "Amino Acid 7 wherein Xaa is Glu or Gly."

## (ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 10
- (D) OTHER INFORMATION: /note= "Amino Acid 10 wherein Xaa is Ser or Arg."

## (ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 15
- (D) OTHER INFORMATION: /note= "Amino Acid 15 wherein Xaa is Glu or Asp."

(ix) **FEATURE:**

- (A) NAME/KEY: Peptide  
(B) LOCATION: 17  
(D) OTHER INFORMATION: /note= "Amino Acid 17 wherein Xaa  
is Arg or Leu."

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884  
(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

Ala Lys Glu Lys Leu Gln Xaa Gln Gln Xaa Asp Leu Glu Gln Xaa Arg  
1 5 10 15

**Xaa**

(2) INFORMATION FOR SEQ ID NO:12:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: peptide

(ix) FEATURE:

- (A) NAME/KEY: Peptide  
(B) LOCATION: 1  
(D) OTHER INFORMATION: /note= "Amino Acid 1 wherein Xaa is Arg or Leu."

(ix) FEATURE:

- (A) NAME/KEY: Peptide  
(B) LOCATION: 8  
(D) OTHER INFORMATION: /note= "Amino Acid 8 wherein Xaa is  
Glu or Gly."

(ix) FEATURE:

- (A) NAME/KEY: Peptide  
(B) LOCATION: 11  
(D) OTHER INFORMATION: /note= "Amino Acid 11 wherein Xaa  
is Ser or Arg."

(ix) **FEATURE:**

- (A) NAME/KEY: Peptide  
(B) LOCATION: 16  
(D) OTHER INFORMATION: /note= "Amino Acid 16 wherein Xaa  
is Glu or Asp."

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884  
(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

(2) INFORMATION FOR SEQ ID NO:13:

- Arg Xaa Ala Lys Glu Lys Leu Gln Xaa Gln Gln Xaa Asp Leu Glu Gln  
1 5 10 15

(2) INFORMATION FOR SEO ID NO:14:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 17 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 1

(D) OTHER INFORMATION: /note= "Amino Acid 1 wherein Xaa is Glu or Asp."

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 3

(D) OTHER INFORMATION: /note= "Amino Acid 3 wherein Xaa is Arg or Leu."

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 10

(D) OTHER INFORMATION: /note= "Amino Acid 10 wherein Xaa is Glu or Gly."

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 13

(D) OTHER INFORMATION: /note= "Amino Acid 13 wherein Xaa is Ser or Arg."

(x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Xaa | Arg | Xaa | Ala | Lys | Glu | Lys | Leu | Gln | Xaa | Gln | Gln | Xaa | Asp | Leu | Glu |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |

Gln

(2) INFORMATION FOR SEQ ID NO:15:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 17 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

(A) NAME/KEY: Peptide

(B) LOCATION: 2

(D) OTHER INFORMATION: /note= "Amino Acid 2 wherein Xaa is Glu or Asp."

(ix) FEATURE:

- (ix) FEATURE:

- (ix) FEATURE:

- (x) PUBLICATION INFORMATION:

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Glu

(i) SEQUENCE CHARACTERISTICS:

- (ii) MOLECULE TYPE: peptide

(ix) FEATURE:

- (ix) **FEATURE:**

- (ix) FEATURE:

- (A) NAME/KEY: Peptide  
(B) LOCATION: 12  
(D) OTHER INFORMATION: /note= "Amino Acid 12 wherein Xaa  
is Glu or Gly."

(ix) **FEATURE:**

- (A) NAME/KEY: Peptide  
(B) LOCATION: 15  
(D) OTHER INFORMATION: /note= "Amino Acid 15 wherein Xaa  
is Ser or Arg."

(X) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884  
(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu Gln Xaa Gln Gln Xaa Asp  
1 5 10 15

Leu

(2) INFORMATION FOR SEQ ID NO:17:

**(i) SEQUENCE CHARACTERISTICS:**

- (A) LENGTH: 17 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: peptide

(ix) **FEATURE:**

- (A) NAME/KEY: Peptide  
(B) LOCATION: 4  
(D) OTHER INFORMATION: /note= "Amino Acid 4 wherein Xaa is  
Glu or Asp."

**(ix) FEATURE:**

- (A) NAME/KEY: Peptide  
(B) LOCATION: 6  
(D) OTHER INFORMATION: /note= "Amino Acid 6 wherein Xaa is Arg or Leu."

**(ix) FEATURE:**

- (A) NAME/KEY: Peptide  
(B) LOCATION: 13  
(D) OTHER INFORMATION: /note= "Amino Acid 13 wherein Xaa  
is Glu or Gly."

**(ix) FEATURE:**

- (A) NAME/KEY: Peptide  
(B) LOCATION: 16  
(D) OTHER INFORMATION: /note= "Amino Acid 16 wherein Xaa  
is Ser or Arg."

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884  
(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu Gln Xaa Gln Gln Xaa  
 1 5 10 15

Asp

(2) INFORMATION FOR SEQ ID NO:18:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 5
- (D) OTHER INFORMATION: /note= "Amino Acid 5 wherein Xaa is Glu or Asp."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 7
- (D) OTHER INFORMATION: /note= "Amino Acid 7 wherein Xaa is Arg or Leu."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 14
- (D) OTHER INFORMATION: /note= "Amino Acid 14 wherein Xaa is Glu or Gly."

(ix) FEATURE:

- (A) NAME/KEY: Peptide
- (B) LOCATION: 17
- (D) OTHER INFORMATION: /note= "Amino Acid 17 wherein Xaa is Ser or Arg."

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

Asp Leu Glu Gln Xaa Arg Xaa Ala Lys Glu Lys Leu Gln Xaa Gln Gln  
 1 5 10 15

Xaa

(2) INFORMATION FOR SEQ ID NO:19:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 107 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

```

Arg Lys Ala Asp Thr Lys Lys Asn Leu Glu Arg Lys Lys Glu His Gly
1 5 10 15
Asp Ile Leu Ala Glu Asp Leu Tyr Gly Arg Leu Glu Ile Pro Ala Ile
 20 25 30
Glu Leu Pro Ser Glu Asn Glu Arg Gly Tyr Tyr Ile Pro His Gln Ser
 35 40 45
Ser Leu Pro Gln Asp Asn Arg Gly Asn Ser Arg Asp Ser Lys Glu Ile
 50 55 60
Ser Ile Ile Glu Lys Thr Asn Arg Glu Ser Ile Thr Thr Asn Val Glu
65 70 75 80
Gly Arg Arg Asp Ile His Lys Gly His Leu Glu Glu Lys Lys Asp Gly
 85 90 95
Ser Ile Lys Pro Glu Gln Lys Glu Asp Lys Ser
 100 105

```

(2) INFORMATION FOR SEQ ID NO:20:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 117 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

```

Leu Gln Glu Gln Gln Arg Asp Leu Glu Gln Arg Lys Ala Asp Thr Lys
1 5 10 15
Lys Asn Leu Glu Arg Lys Lys Glu His Gly Asp Ile Leu Ala Glu Asp
 20 25 30
Leu Tyr Gly Arg Leu Glu Ile Pro Ala Ile Glu Leu Pro Ser Glu Asn
 35 40 45

```



Glu Arg Gly Tyr Tyr Ile Pro His Gln Ser Ser Leu Pro Gln Asp Asn  
 50 55 60  
 Arg Gly Asn Ser Arg Asp Ser Lys Glu Ile Ser Ile Ile Glu Lys Thr  
 65 70 75 80  
 Asn Arg Glu Ser Ile Thr Thr Asn Val Glu Gly Arg Arg Asp Ile His  
 85 90 95  
 Lys Gly His Leu Glu Glu Lys Lys Asp Gly Ser Ile Lys Pro Glu Gln  
 100 105 110  
 Lys Glu Asp Lys Ser  
 115

## (2) INFORMATION FOR SEQ ID NO:21:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 27 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: peptide

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

Asp Thr Lys Lys Asn Leu Glu Arg Lys Lys Glu His Gly Asp Ile Leu  
 1 5 10 15  
 Ala Glu Asp Leu Tyr Gly Arg Leu Glu Ile Pro  
 20 25

## (2) INFORMATION FOR SEQ ID NO:22:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: peptide

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Arg Asp Leu Glu  
 1 5 10 15

Gln Arg Lys Ala Asp Thr Lys Lys  
20

(2) INFORMATION FOR SEQ ID NO:23:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Ser | Arg | Asp | Ser | Lys | Glu | Ile | Ser | Ile | Ile | Glu | Lys | Thr | Asn | Arg |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     |     | 15  |     |
| Glu | Ser | Ile | Thr | Thr | Asn | Val | Glu | Gly | Arg | Arg | Asp | Ile | His | Lys |     |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |

(2) INFORMATION FOR SEQ ID NO:24:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 151 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Asp | Glu | Leu | Phe | Asn | Glu | Leu | Leu | Asn | Ser | Val | Asp | Val | Asn | Gly |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Glu | Val | Lys | Glu | Asn | Ile | Leu | Glu | Glu | Ser | Gln | Val | Asn | Asp | Asp | Ile |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Phe | Asn | Ser | Leu | Val | Lys | Ser | Val | Gln | Gln | Glu | Gln | Gln | His | Asn | Val |
|     |     |     | 35  |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Glu | Glu | Lys | Val | Glu | Glu | Ser | Val | Glu | Glu | Asn | Asp | Glu | Glu | Ser | Val |
|     |     |     | 50  |     |     |     | 55  |     |     |     | 60  |     |     |     |     |
| Glu | Glu | Asn | Val | Glu | Glu | Asn | Val | Glu | Glu | Asn | Asp | Asp | Gly | Ser | Val |
| 65  |     |     |     | 70  |     |     |     |     |     | 75  |     |     |     | 80  |     |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Ser | Ser | Val | Glu | Glu | Ser | Ile | Ala | Ser | Ser | Val | Asp | Glu | Ser | Ile |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Asp | Ser | Ser | Ile | Glu | Glu | Asn | Val | Ala | Pro | Thr | Val | Glu | Glu | Ile | Val |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Ala | Pro | Thr | Val | Glu | Glu | Ile | Val | Ala | Pro | Ser | Val | Val | Glu | Lys | Cys |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Ala | Pro | Ser | Val | Glu | Glu | Ser | Val | Ala | Pro | Ser | Val | Glu | Glu | Ser | Val |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Ala | Glu | Met | Leu | Lys | Glu | Arg |     |     |     |     |     |     |     |     |     |
| 145 |     |     |     |     | 150 |     |     |     |     |     |     |     |     |     |     |

## (2) INFORMATION FOR SEQ ID NO:25:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 47 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: peptide

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Asp | Glu | Leu | Phe | Asn | Glu | Leu | Leu | Asn | Ser | Val | Asp | Val | Asn | Gly |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Glu | Val | Lys | Glu | Asn | Ile | Leu | Glu | Glu | Ser | Gln | Val | Asn | Asp | Asp | Ile |
|     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |     |
| Phe | Asn | Ser | Leu | Val | Lys | Ser | Val | Gln | Gln | Glu | Gln | Gln | His | Asn |     |
|     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |     |

## (2) INFORMATION FOR SEQ ID NO:26:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 26 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: peptide

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:



(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

TTGTTCTAGA TCGCTTT

17

(2) INFORMATION FOR SEQ ID NO:30:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 15 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

AAAGAAGATA AATCT

15

(2) INFORMATION FOR SEQ ID NO:31:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 316 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln  
1 5 10 15

Gln Ser Asp Leu Glu Gln Asp Arg Leu Ala Lys Glu Lys Leu Gln Glu  
20 25 30

Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln  
35 40 45

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | Glu | Arg | Arg | Ala | Lys | Glu | Lys | Leu | 50  | 55  | 60  |
| Gln | Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | Glu | Arg | Arg | Ala | Lys | Glu | Lys | 65  | 70  | 75  |
| Leu | Gln | Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | Asp | Arg | Leu | Ala | Lys | Glu | 85  | 90  | 95  |
| Lys | Leu | Gln | Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | Glu | Arg | Arg | Ala | Lys | 100 | 105 | 110 |
| Glu | Lys | Leu | Gln | Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | Glu | Arg | Arg | Ala | 115 | 120 | 125 |
| Lys | Glu | Lys | Leu | Gln | Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | Glu | Arg | Arg | 130 | 135 | 140 |
| Ala | Lys | Glu | Lys | Leu | Gln | Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | Glu | Arg | 145 | 150 | 155 |
| Arg | Ala | Lys | Glu | Lys | Leu | Gln | Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | Glu | 165 | 170 | 175 |
| Arg | Arg | Ala | Lys | Glu | Lys | Leu | Gln | Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | 180 | 185 | 190 |
| Glu | Arg | Arg | Ala | Lys | Glu | Lys | Leu | Gln | Glu | Gln | Gln | Arg | Asp | Leu | Glu | 195 | 200 | 205 |
| Gln | Arg | Lys | Ala | Asp | Thr | Lys | Lys | Asn | Leu | Glu | Arg | Lys | Lys | Glu | His | 210 | 215 | 220 |
| Gly | Asp | Ile | Leu | Ala | Glu | Asp | Leu | Tyr | Gly | Arg | Leu | Glu | Ile | Pro | Ala | 225 | 230 | 235 |
| Ile | Glu | Leu | Pro | Ser | Glu | Asn | Glu | Arg | Gly | Tyr | Tyr | Ile | Pro | His | Gln | 245 | 250 | 255 |
| Ser | Ser | Leu | Pro | Gln | Asp | Asn | Arg | Gly | Asn | Ser | Arg | Asp | Ser | Lys | Glu | 260 | 265 | 270 |
| Ile | Ser | Ile | Ile | Glu | Lys | Thr | Asn | Arg | Glu | Ser | Ile | Thr | Thr | Asn | Val | 275 | 280 | 285 |
| Glu | Gly | Arg | Arg | Asp | Ile | His | Lys | Gly | His | Leu | Glu | Glu | Lys | Lys | Asp | 290 | 295 | 300 |
| Gly | Ser | Ile | Lys | Pro | Glu | Gln | Lys | Glu | Asp | Lys | Ser |     |     |     |     | 305 | 310 | 315 |

## (2) INFORMATION FOR SEQ ID NO:32:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 950 base pairs  
 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

|                                                                   |     |
|-------------------------------------------------------------------|-----|
| AAAGCGATCT AGAACAAGAG AGACGTGCTA AAGAAAAGTT GCAAGAACAA CAAAGCGATT | 60  |
| TAGAACAAGA TAGACTTGCT AAAGAAAAGT TACAAGAGCA GCAAAGCGAT TTAGAACAAG | 120 |
| AGAGACTTGC TAAAGAAAAG TTGCAAGAAC AACAAAGCGA TCTAGAACAA GAGAGACGTG | 180 |
| CTAAAGAAAA GTTGCAAGAA CAACAAAGCG ATTTAGAACA AGAGAGACGT GCTAAAGAAA | 240 |
| AGTTGCAAGA ACAACAAAGC GATTTAGAAC AAGATAGACT TGCTAAAGAA AAGTTACAAG | 300 |
| AGCAGCAAAG CGATTTAGAA CAAGAGAGAC GTGCTAAAGA AAAGTTGCAA GAACAACAAA | 360 |
| GCGATTTAGA ACAAGAGAGA CGTGCTAAAG AAAAGTTGCA AGAACAACAA AGCGATTTAG | 420 |
| AACAAGAGAG ACTTGCTAAA GAAAAGTTGC AAGAACAACA AAGCGATTTA GAACAAGAGA | 480 |
| GACGTGCTAA AGAAAAGTTG CAAGAACAAC AAAGCGATTT AGAACAAGAG AGACGTGCTA | 540 |
| AAGAAAAGTT GCAAGAACAA CAAAGCGATT TAGAACAAGA GAGACGTGCT AAAGAAAAGT | 600 |
| TGCAAGAGCA GCAAAGAGAT TTAGAACAAA GGAAGGCTGA TACGAAAAAA AATTTAGAAA | 660 |
| GAAAAAAGGA ACATGGAGAT ATATTAGCAG AGGATTTATA TGGTCGTTTA GAAATACCAG | 720 |
| CTATAGAACT TCCATCAGAA AATGAACGTG GATATTATAT ACCACATCAA TCTTCTTTAC | 780 |
| CTCAGGACAA CAGAGGGAAT AGTAGAGATT CCAAGGAAAT ATCTATAATA GAAAAACAA  | 840 |
| ATAGAGAATC TATTACAACA AATGTTGAAG GACGAAGGGA TATACATAAA GGACATCTTG | 900 |
| AAGAAAAGAA AGATGGTTCA ATAAAACCAG AACAAAAAGA AGATAAATCT            | 950 |

(2) INFORMATION FOR SEQ ID NO:33:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 464 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

|                                                                    |     |
|--------------------------------------------------------------------|-----|
| GAATTCCTG ATGAACTTTT TAATGAATTA TTAAATAGTG TAGATGTTAA TGGAGAAGTA   | 60  |
| AAAGAAAATA TTTTGGAGGA AAGTCAAGTT AATGACGATA TTTTAAATAG TTTAGTAAAA  | 120 |
| AGTGTTCAC AAGAACAACA ACACAATGTT GAAGAAAAAG TTGAAGAAAG TGTTAGAAGAA  | 180 |
| AATGACGAAG AAAGTGTAGA AGAAAATGTA GAAGAAAATG TAGAAGAAAA TGACGACGGA  | 240 |
| AGTGTAGCCT CAAGTGTGTA AGAAAGTATA GCTTCAAGTG TTGATGAAAG TATAGATTCA  | 300 |
| AGTATTGAAG AAAATGTAGC TCCAACGTGTT GAAGAAATCG TAGCTCCAAC TGTGTAAGAA | 360 |
| ATTGTAGCTC CAAGTGTGTT AGAAAAGTGT GCTCCAAGTG TTGAAGAAAG TGTAGCTCCA  | 420 |
| AGTGTGTAAG AAAGTGTAGC TGAAATGTTG AAGGAAAGGA ATTC                   | 464 |

## (2) INFORMATION FOR SEQ ID NO:34:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 988 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

|                                                                                 |     |
|---------------------------------------------------------------------------------|-----|
| AAAGTATACA TCTTCCTTCT TTA <del>CT</del> TTCTTA AAATGAAACA TATTTTGTAC ATATCATTTT | 60  |
| ACTTTATCCT TGTTAATTTA TTGATATTTT ATATAAATGG AAAGATAATA AAGAATTCTG               | 120 |
| AAAAAGATGA AATCATAAAA TCTAACTTGA GAAGTGGTTC TTCAAATTCT AGGAATCGAA               | 180 |
| TAAATGAGGA AAATCACGAG AAGAAACACG TTTTATCTCA TAATTCATAT GAGAAAAC <del>TA</del>   | 240 |
| AAAATAATGA AAATAATAAA TTTTTCGATA AGGATAAAGA GTTAACGATG TCTAATGTAA               | 300 |
| AAAATGTGTC ACAAACAAAT TTCAAAGTC TTTTAAGAAA TCTTGGTGTT TCAGAGAATA                | 360 |
| TATTCCTTAA AGAAAATAAA TTAAATAAGG AAGGGAAATT AATTGAACAC ATAATAAATG               | 420 |
| ATGATGACGA TAAAAA <del>AAAA</del> TATATTAAAG GGCAAGACGA AAACAGACAA GAAGATCTTG   | 480 |
| AAGAAAAAGC AGCTAAAGAA AAGTTACAGG GGCAACAAAG CGATTCAGAA CAAGAGAGAC               | 540 |
| GTGCTAAAGA AAAGTTGCAA GAACAACAAA GCGATTTAGA ACAAGAGAGA CTTGCTAAAG               | 600 |
| AAAAGTTGCA AGAACAACAA AGCGATTTAG AACAAGAGAG ACGTGCTAAA GAAAAGTTGC               | 660 |



|                                                                   |     |
|-------------------------------------------------------------------|-----|
| AAGAACAACA AAGCGATTTA GAACAAGAGA GACTTGCTAA AGAAAAGTTG CAAGAACAAC | 720 |
| AAAGCGATTT AGAACAAGAG AGACGTGCTA AAGAAAAGTT GCAAGAACAA CAAAGCGATT | 780 |
| TAGAACAAGA GAGACGTGCT AAAGAAAAGT TGCAAGAACA ACAAAGCGAT TTAGAACAAG | 840 |
| AGAGACTTGC TAAAGAAAAG TTACAAGAGC AGCAAAGCGA TTTAGAACAA GATAGACTTG | 900 |
| CTAAAGAAAA GTTGCAAGAA CAACAAAGCG ATTTAGAACA AGAGAGACGT GCTAAAGAAA | 960 |
| GGTTGCAAGA ACAACAAAGC GATTTAGA                                    | 988 |

## (2) INFORMATION FOR SEQ ID NO:35:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 12 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

ATGAAACATA TT

12

## (2) INFORMATION FOR SEQ ID NO:36:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 12 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

AAGCGATTTA GA

12

## (2) INFORMATION FOR SEQ ID NO:37:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 954 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(ix) FEATURE:

(A) NAME/KEY: CDS

(B) LOCATION: 1..954

(x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:

|                                                                 |     |
|-----------------------------------------------------------------|-----|
| ATG AAA CAT ATT TTG TAC ATA TCA TTT TAC TTT ATC CTT GTT AAT TTA | 48  |
| Met Lys His Ile Leu Tyr Ile Ser Phe Tyr Phe Ile Leu Val Asn Leu |     |
| 1 5 10 15                                                       |     |
| TTG ATA TTT CAT ATA AAT GGA AAG ATA ATA AAG AAT TCT GAA AAA GAT | 96  |
| Leu Ile Phe His Ile Asn Gly Lys Ile Ile Lys Asn Ser Glu Lys Asp |     |
| 20 25 30                                                        |     |
| GAA ATC ATA AAA TCT AAC TTG AGA AGT GGT TCT TCA AAT TCT AGG AAT | 144 |
| Glu Ile Ile Lys Ser Asn Leu Arg Ser Gly Ser Ser Asn Ser Arg Asn |     |
| 35 40 45                                                        |     |
| CGA ATA AAT GAG GAA AAT CAC GAG AAG AAA CAC GTT TTA TCT CAT AAT | 192 |
| Arg Ile Asn Glu Glu Asn His Glu Lys Lys His Val Leu Ser His Asn |     |
| 50 55 60                                                        |     |
| TCA TAT GAG AAA ACT AAA AAT AAT GAA AAT AAT AAA TTT TTC GAT AAG | 240 |
| Ser Tyr Glu Lys Thr Lys Asn Asn Glu Asn Asn Lys Phe Phe Asp Lys |     |
| 65 70 75 80                                                     |     |
| GAT AAA GAG TTA ACG ATG TCT AAT GTA AAA AAT GTG TCA CAA ACA AAT | 288 |
| Asp Lys Glu Leu Thr Met Ser Asn Val Lys Asn Val Ser Gln Thr Asn |     |
| 85 90 95                                                        |     |
| TTC AAA AGT CTT TTA AGA AAT CTT GGT GTT TCA GAG AAT ATA TTC CTT | 336 |
| Phe Lys Ser Leu Leu Arg Asn Leu Gly Val Ser Glu Asn Ile Phe Leu |     |
| 100 105 110                                                     |     |
| AAA GAA AAT AAA TTA AAT AAG GAA GGG AAA TTA ATT GAA CAC ATA ATA | 384 |
| Lys Glu Asn Lys Leu Asn Lys Glu Gly Lys Leu Ile Glu His Ile Ile |     |
| 115 120 125                                                     |     |
| AAT GAT GAT GAC GAT AAA AAA AAA TAT ATT AAA GGG CAA GAC GAA AAC | 432 |
| Asn Asp Asp Asp Asp Lys Lys Lys Tyr Ile Lys Gly Gln Asp Glu Asn |     |
| 130 135 140                                                     |     |
| AGA CAA GAA GAT CTT GAA GAA AAA GCA GCT AAA GAA AAG TTA CAG GGG | 480 |
| Arg Gln Glu Asp Leu Glu Glu Lys Ala Ala Lys Glu Lys Leu Gln Gly |     |
| 145 150 155 160                                                 |     |
| CAA CAA AGC GAT TCA GAA CAA GAG AGA CGT GCT AAA GAA AAG TTG CAA | 528 |
| Gln Gln Ser Asp Ser Glu Gln Glu Arg Arg Ala Lys Glu Lys Leu Gln |     |
| 165 170 175                                                     |     |

|                                                                                                                                                       |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| GAA CAA CAA AGC GAT TTA GAA CAA GAG AGA CTT GCT AAA GAA AAG TTG<br>Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys Glu Lys Leu<br>180 185 190     | 576 |
| CAA GAA CAA CAA AGC GAT TTA GAA CAA GAG AGA CGT GCT AAA GAA AAG<br>Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys<br>195 200 205     | 624 |
| TTG CAA GAA CAA CAA AGC GAT TTA GAA CAA GAG AGA CTT GCT AAA GAA<br>Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys Glu<br>210 215 220     | 672 |
| AAG TTG CAA GAA CAA CAA AGC GAT TTA GAA CAA GAG AGA CGT GCT AAA<br>Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys<br>225 230 235 240 | 720 |
| GAA AAG TTG CAA GAA CAA CAA AGC GAT TTA GAA CAA GAG AGA CGT GCT<br>Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala<br>245 250 255     | 768 |
| AAA GAA AAG TTG CAA GAA CAA CAA AGC GAT TTA GAA CAA GAG AGA CTT<br>Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu<br>260 265 270     | 816 |
| GCT AAA GAA AAG TTG CAA GAG CAG CAA AGC GAT TTA GAA CAA GAT AGA<br>Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg<br>275 280 285     | 864 |
| CTT GCT AAA GAA AAG TTG CAA GAA CAA CAA AGC GAT TTA GAA CAA GAG<br>Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu<br>290 295 300     | 912 |
| AGA CGT GCT AAA GAA AGG TTG CAA GAA CAA CAA AGC GAT TTA<br>Arg Arg Ala Lys Glu Arg Leu Gln Glu Gln Gln Ser Asp Leu<br>305 310 315                     | 954 |

## (2) INFORMATION FOR SEQ ID NO:38:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 1493 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:38:

|                                                                   |     |
|-------------------------------------------------------------------|-----|
| CAAGAACAAC AAAGCGATCT AGAACAAGAG AGACGTGCTA AAGAAAAGTT GCAAGAACAA | 60  |
| CAAAGCGATT TAGAACAAGA TAGACTTGCT AAAGAAAAGT TACAAGAGCA GCAAAGCGAT | 120 |

|                                                                    |      |
|--------------------------------------------------------------------|------|
| TTAGAACAAG AGAGACTTGC TAAGAAAAGT TGCAAGAACA ACAAAGCGAT CTAGAACAAG  | 180  |
| AGAGACGTGC TAAAGAAAAG TTGCAAGAAC AACAAAGCGA TTTAGAACAA GAGAGACGTG  | 240  |
| CTAAAGAAAA GTTGCAAGAA CAACAAAGCG ATTTAGAACA AGATAGACTT GCTAAAGAAA  | 300  |
| AGTTACAAGA GCAGCAAAGC GATTTAGAAC AAGAGAGACG TGCTAAAGAA AAGTTGCAAG  | 360  |
| AACAACAAAG CGATTTAGAA CAAGAGAGAC GTGCTAAGAA AAGTTGCAAG AACAACAAAG  | 420  |
| CGATTTAGAA CAAGAGAGAC TTGCTAAAGA AAAGTTGCAA GAACAACAAA GCGATTTAGA  | 480  |
| ACAAGAGAGA CGTGCTAAAG AAAAGTTGCA AGAACAACAA AGCGATTTAG AACAAGAGAG  | 540  |
| ACGTGCTAAG AAAAGTTGCA AGAACAACAA AGCGATTTAG AACAAGAGAG ACGTGCTAAA  | 600  |
| GAAAAGTTGC AAGAGCAGCA AAGAGATTTA GAACAAAGGA AGGCTGATAC GAAAAAAAT   | 660  |
| TTAGAAAGAA AAAAGGAACA TGGAGATATA TTAGCAGAGG ATTTATATGG TCGTTTAGAA  | 720  |
| ATACCAGCTA TAGAACTTCC ATCAGAAAAT GAACGTGGAT ATTATATACC ACATCAATCT  | 780  |
| TCTTTACCTC AGGACAACAG AGGGAATAGT AGAGATTCCA AGGAAATATC TATAATAGAA  | 840  |
| AAAACAAATA GAGAATCTAT TACAACAAAT GTTGAAGGAC GAAGGGATAT ACATAAAGGA  | 900  |
| CATCTTGAAG AAAAGAAAGA TGGTTCAATA AAACCAGAAC AAAAAGAAGA TAAATCTGCT  | 960  |
| GACATACAAA ATCATAACATT AGAGACAGTA AATATTTCTG ATGTTAATGA TTTTCAAATA | 1020 |
| AGTAAGTATG AGGATGAAAT AAGTGCTGAA TATGACGATT CATTAATAGA TGAAGAAGAA  | 1080 |
| GATGATGAAG ACTTAGACGA ATTTAAGCCT ATTG TGCAAT ATGACAATTT CCAAGATGAA | 1140 |
| GAAAACATAG GAATTTATAA AGAACTAGAA GATTTGATAG AGAAAAATGA AAATTTAGAT  | 1200 |
| GATTTAGATG AAGGAATAGA AAAATCATCA GAAGAATTAT CTGAAGAAAA AATAAAAAAA  | 1260 |
| GGAAAGAAAT ATGAAAAAAC AAAGGATAAT AATTTTAAAC CAAATGATAA AAGTTTGTAT  | 1320 |
| GATGAGCATA TTAATAAATA TAAAAATGAT AAGCAGGTTA ATAAGGAAAA GGAAAAATTC  | 1380 |
| ATAAAATCAT TGTTTCATAT ATTTGACGGA GACAATGAAA TTTTACAGAT CGTGGATGAG  | 1440 |
| TTATCTGAAG ATATAACTAA ATATTTTATG AAAC TATAAA AGGTTATATA TTT        | 1493 |

(2) INFORMATION FOR SEQ ID NO:39:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 12 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

## (x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:39:

CAAGAACAAC AA

12

## (2) INFORMATION FOR SEQ ID NO:40:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 12 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:40:

GGTTATATAT TT

12

## (2) INFORMATION FOR SEQ ID NO:41:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 1482 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (ix) FEATURE:

(A) NAME/KEY: CDS

(B) LOCATION: 1..1482

## (x) PUBLICATION INFORMATION:

(H) DOCUMENT NUMBER: WO 92/13884

(J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:41:

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| CAA | GAA | CAA | CAA | AGC | GAT | CTA | GAA | CAA | GAG | AGA | CGT | GCT | AAA | GAA | AAG |    |
| Gln | Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | Glu | Arg | Arg | Ala | Lys | Glu | Lys | 48 |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |    |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| TTG | CAA | GAA | CAA | CAA | AGC | GAT | TTA | GAA | CAA | GAT | AGA | CTT | GCT | AAA | GAA |    |
| Leu | Gln | Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | Asp | Arg | Leu | Ala | Lys | Glu | 96 |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |    |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| AAG | TTA | CAA | GAG | CAG | CAA | AGC | GAT | TTA | GAA | CAA | GAG | AGA | CTT | GCT | AAA |     |
| Lys | Leu | Gln | Glu | Gln | Gln | Ser | Asp | Leu | Glu | Gln | Glu | Arg | Leu | Ala | Lys | 144 |

| 35         |            |            |            |            | 40         |            |            |            |            | 45         |            |            |            |            |            |     |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----|
| GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | GAT<br>Asp | CTA<br>Leu | GAA<br>Glu | CAA<br>Gln | GAG<br>Glu | AGA<br>Arg | CGT<br>Arg | GCT<br>Ala | 192 |
| 50         |            |            |            |            | 55         |            |            |            |            | 60         |            |            |            |            |            |     |
| AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | GAT<br>Asp | TTA<br>Leu | GAA<br>Glu | CAA<br>Gln | GAG<br>Glu | AGA<br>Arg | CGT<br>Arg | 240 |
| 65         |            |            |            |            | 70         |            |            |            |            | 75         |            |            |            |            | 80         |     |
| GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | GAT<br>Asp | TTA<br>Leu | GAA<br>Glu | CAA<br>Gln | GAT<br>Asp | AGA<br>Arg | 288 |
| 85         |            |            |            |            | 90         |            |            |            |            | 95         |            |            |            |            |            |     |
| CTT<br>Leu | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTA<br>Leu | CAA<br>Gln | GAG<br>Glu | CAG<br>Gln | CAA<br>Gln | AGC<br>Ser | GAT<br>Asp | TTA<br>Leu | GAA<br>Glu | CAA<br>Gln | GAG<br>Glu | 336 |
| 100        |            |            |            |            | 105        |            |            |            |            | 110        |            |            |            |            |            |     |
| AGA<br>Arg | CGT<br>Arg | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | GAT<br>Asp | TTA<br>Leu | GAA<br>Glu | CAA<br>Gln | 384 |
| 115        |            |            |            |            | 120        |            |            |            |            | 125        |            |            |            |            |            |     |
| GAG<br>Glu | AGA<br>Arg | CGT<br>Arg | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | GAT<br>Asp | TTA<br>Leu | GAA<br>Glu | 432 |
| 130        |            |            |            |            | 135        |            |            |            |            | 140        |            |            |            |            |            |     |
| CAA<br>Gln | GAG<br>Glu | AGA<br>Arg | CTT<br>Leu | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | GAT<br>Asp | TTA<br>Leu | 480 |
| 145        |            |            |            |            | 150        |            |            |            |            | 155        |            |            |            |            | 160        |     |
| GAA<br>Glu | CAA<br>Gln | GAG<br>Glu | AGA<br>Arg | CGT<br>Arg | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | GAT<br>Asp | 528 |
| 165        |            |            |            |            | 170        |            |            |            |            | 175        |            |            |            |            |            |     |
| TTA<br>Leu | GAA<br>Glu | CAA<br>Gln | GAG<br>Glu | AGA<br>Arg | CGT<br>Arg | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | 576 |
| 180        |            |            |            |            | 185        |            |            |            |            | 190        |            |            |            |            |            |     |
| GAT<br>Asp | TTA<br>Leu | GAA<br>Glu | CAA<br>Gln | GAG<br>Glu | AGA<br>Arg | CGT<br>Arg | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAG<br>Glu | CAG<br>Gln | CAA<br>Gln | 624 |
| 195        |            |            |            |            | 200        |            |            |            |            | 205        |            |            |            |            |            |     |
| AGA<br>Arg | GAT<br>Asp | TTA<br>Leu | GAA<br>Glu | CAA<br>Gln | AGG<br>Arg | AAG<br>Lys | GCT<br>Ala | GAT<br>Asp | ACG<br>Thr | AAA<br>Lys | AAA<br>Lys | AAT<br>Asn | TTA<br>Leu | GAA<br>Glu | AGA<br>Arg | 672 |
| 210        |            |            |            |            | 215        |            |            |            |            | 220        |            |            |            |            |            |     |
| AAA<br>Lys | AAG<br>Lys | GAA<br>Glu | CAT<br>His | GGA<br>Gly | GAT<br>Asp | ATA<br>Ile | TTA<br>Leu | GCA<br>Ala | GAG<br>Glu | GAT<br>Asp | TTA<br>Leu | TAT<br>Tyr | GGT<br>Gly | CGT<br>Arg | TTA<br>Leu | 720 |
| 225        |            |            |            |            | 230        |            |            |            |            | 235        |            |            |            |            | 240        |     |
| GAA<br>Glu | ATA<br>Ile | CCA<br>Pro | GCT<br>Ala | ATA<br>Ile | GAA<br>Glu | CTT<br>Leu | CCA<br>Pro | TCA<br>Ser | GAA<br>Glu | AAT<br>Asn | GAA<br>Glu | CGT<br>Arg | GGA<br>Gly | TAT<br>Tyr | TAT<br>Tyr | 768 |
| 245        |            |            |            |            | 250        |            |            |            |            | 255        |            |            |            |            |            |     |
| ATA<br>Ile | CCA<br>Pro | CAT<br>His | CAA<br>Gln | TCT<br>Ser | TCT<br>Ser | TTA<br>Leu | CCT<br>Pro | CAG<br>Gln | GAC<br>Asp | AAC<br>Asn | AGA<br>Arg | GGG<br>Gly | AAT<br>Asn | AGT<br>Ser | AGA<br>Arg | 816 |

| 260 |     |     | 265 |     |     | 270 |     |     |     |     |     |     |     |     |     |  |  |      |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|------|
| GAT | TCC | AAG | GAA | ATA | TCT | ATA | ATA | GAA | AAA | ACA | AAT | AGA | GAA | TCT | ATT |  |  | 864  |
| Asp | Ser | Lys | Glu | Ile | Ser | Ile | Ile | Glu | Lys | Thr | Asn | Arg | Glu | Ser | Ile |  |  |      |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |  |  |      |
| ACA | ACA | AAT | GTT | GAA | GGA | CGA | AGG | GAT | ATA | CAT | AAA | GGA | CAT | CTT | GAA |  |  | 912  |
| Thr | Thr | Asn | Val | Glu | Gly | Arg | Arg | Asp | Ile | His | Lys | Gly | His | Leu | Glu |  |  |      |
|     |     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |  |  |      |
| GAA | AAG | AAA | GAT | GGT | TCA | ATA | AAA | CCA | GAA | CAA | AAA | GAA | GAT | AAA | TCT |  |  | 960  |
| Glu | Lys | Lys | Asp | Gly | Ser | Ile | Lys | Pro | Glu | Gln | Lys | Glu | Asp | Lys | Ser |  |  |      |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |  |  |      |
| GCT | GAC | ATA | CAA | AAT | CAT | ACA | TTA | GAG | ACA | GTA | AAT | ATT | TCT | GAT | GTT |  |  | 1008 |
| Ala | Asp | Ile | Gln | Asn | His | Thr | Leu | Glu | Thr | Val | Asn | Ile | Ser | Asp | Val |  |  |      |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |  |  |      |
| AAT | GAT | TTT | CAA | ATA | AGT | AAG | TAT | GAG | GAT | GAA | ATA | AGT | GCT | GAA | TAT |  |  | 1056 |
| Asn | Asp | Phe | Gln | Ile | Ser | Lys | Tyr | Glu | Asp | Glu | Ile | Ser | Ala | Glu | Tyr |  |  |      |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |  |  |      |
| GAC | GAT | TCA | TTA | ATA | GAT | GAA | GAA | GAA | GAT | GAT | GAA | GAC | TTA | GAC | GAA |  |  | 1104 |
| Asp | Asp | Ser | Leu | Ile | Asp | Glu | Glu | Glu | Asp | Asp | Glu | Asp | Leu | Asp | Glu |  |  |      |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |  |  |      |
| TTT | AAG | CCT | ATT | GTG | CAA | TAT | GAC | AAT | TTC | CAA | GAT | GAA | GAA | AAC | ATA |  |  | 1152 |
| Phe | Lys | Pro | Ile | Val | Gln | Tyr | Asp | Asn | Phe | Gln | Asp | Glu | Glu | Asn | Ile |  |  |      |
|     |     | 370 |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |  |  |      |
| GGA | ATT | TAT | AAA | GAA | CTA | GAA | GAT | TTG | ATA | GAG | AAA | AAT | GAA | AAT | TTA |  |  | 1200 |
| Gly | Ile | Tyr | Lys | Glu | Leu | Glu | Asp | Leu | Ile | Glu | Lys | Asn | Glu | Asn | Leu |  |  |      |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |  |  |      |
| GAT | GAT | TTA | GAT | GAA | GGA | ATA | GAA | AAA | TCA | TCA | GAA | GAA | TTA | TCT | GAA |  |  | 1248 |
| Asp | Asp | Leu | Asp | Glu | Gly | Ile | Glu | Lys | Ser | Ser | Glu | Glu | Leu | Ser | Glu |  |  |      |
|     |     |     |     | 405 |     |     |     | 410 |     |     |     |     | 415 |     |     |  |  |      |
| GAA | AAA | ATA | AAA | AAA | GGA | AAG | AAA | TAT | GAA | AAA | ACA | AAG | GAT | AAT | AAT |  |  | 1296 |
| Glu | Lys | Ile | Lys | Lys | Gly | Lys | Lys | Tyr | Glu | Lys | Thr | Lys | Asp | Asn | Asn |  |  |      |
|     |     |     | 420 |     |     |     | 425 |     |     |     |     |     | 430 |     |     |  |  |      |
| TTT | AAA | CCA | AAT | GAT | AAA | AGT | TTG | TAT | GAT | GAG | CAT | ATT | AAA | AAA | TAT |  |  | 1344 |
| Phe | Lys | Pro | Asn | Asp | Lys | Ser | Leu | Tyr | Asp | Glu | His | Ile | Lys | Lys | Tyr |  |  |      |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |  |  |      |
| AAA | AAT | GAT | AAG | CAG | GTT | AAT | AAG | GAA | AAG | GAA | AAA | TTC | ATA | AAA | TCA |  |  | 1392 |
| Lys | Asn | Asp | Lys | Gln | Val | Asn | Lys | Glu | Lys | Glu | Lys | Phe | Ile | Lys | Ser |  |  |      |
|     |     | 450 |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |  |  |      |
| TTG | TTT | CAT | ATA | TTT | GAC | GGA | GAC | AAT | GAA | ATT | TTA | CAG | ATC | GTG | GAT |  |  | 1440 |
| Leu | Phe | His | Ile | Phe | Asp | Gly | Asp | Asn | Glu | Ile | Leu | Gln | Ile | Val | Asp |  |  |      |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |  |  |      |
| GAG | TTA | TCT | GAA | GAT | ATA | ACT | AAA | TAT | TTT | ATG | AAA | CTA | TAA |     |     |  |  | 1482 |
| Glu | Leu | Ser | Glu | Asp | Ile | Thr | Lys | Tyr | Phe | Met | Lys | Leu |     |     |     |  |  |      |

## (2) INFORMATION FOR SEQ ID NO:42:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 12 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..12

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:42:

AAG GTT ATA TAT  
Lys Val Ile Tyr  
1

12

## (2) INFORMATION FOR SEQ ID NO:43:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 12 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:43:

CAAGAACAAC AA

12

## (2) INFORMATION FOR SEQ ID NO:44:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 12 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884



(J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:44:

ATGAAACTAT AA

12

(2) INFORMATION FOR SEQ ID NO:45:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 1482 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..1482

(x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:45:

|                                                                 |     |
|-----------------------------------------------------------------|-----|
| CAA GAA CAA CAA AGC GAT CTA GAA CAA GAG AGA CGT GCT AAA GAA AAG | 48  |
| Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala Lys Glu Lys |     |
| 1 5 10 15                                                       |     |
| TTG CAA GAA CAA CAA AGC GAT TTA GAA CAA GAT AGA CTT GCT AAA GAA | 96  |
| Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg Leu Ala Lys Glu |     |
| 20 25 30                                                        |     |
| AAG TTA CAA GAG CAG CAA AGC GAT TTA GAA CAA GAG AGA CTT GCT AAA | 144 |
| Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Leu Ala Lys |     |
| 35 40 45                                                        |     |
| GAA AAG TTG CAA GAA CAA CAA AGC GAT CTA GAA CAA GAG AGA CGT GCT | 192 |
| Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg Ala |     |
| 50 55 60                                                        |     |
| AAA GAA AAG TTG CAA GAA CAA CAA AGC GAT TTA GAA CAA GAG AGA CGT | 240 |
| Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu Arg Arg |     |
| 65 70 75 80                                                     |     |
| GCT AAA GAA AAG TTG CAA GAA CAA CAA AGC GAT TTA GAA CAA GAT AGA | 288 |
| Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Asp Arg |     |
| 85 90 95                                                        |     |
| CTT GCT AAA GAA AAG TTA CAA GAG CAG CAA AGC GAT TTA GAA CAA GAG | 336 |
| Leu Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln Glu |     |
| 100 105 110                                                     |     |
| AGA CGT GCT AAA GAA AAG TTG CAA GAA CAA CAA AGC GAT TTA GAA CAA | 384 |
| Arg Arg Ala Lys Glu Lys Leu Gln Glu Gln Gln Ser Asp Leu Glu Gln |     |

| 115        |            |            |            |            | 120        |            |            |            |            | 125        |            |            |            |            |            |      |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------|
| GAG<br>Glu | AGA<br>Arg | CGT<br>Arg | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | GAT<br>Asp | TTA<br>Leu | GAA<br>Glu | 432  |
| 130        |            |            |            |            | 135        |            |            |            |            | 140        |            |            |            |            |            |      |
| CAA<br>Gln | GAG<br>Glu | AGA<br>Arg | CTT<br>Leu | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | GAT<br>Asp | TTA<br>Leu | 480  |
| 145        |            |            |            |            | 150        |            |            |            |            | 155        |            |            |            |            | 160        |      |
| GAA<br>Glu | CAA<br>Gln | GAG<br>Glu | AGA<br>Arg | CGT<br>Arg | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | GAT<br>Asp | 528  |
| 165        |            |            |            |            | 170        |            |            |            |            | 175        |            |            |            |            |            |      |
| TTA<br>Leu | GAA<br>Glu | CAA<br>Gln | GAG<br>Glu | AGA<br>Arg | CGT<br>Arg | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAA<br>Glu | CAA<br>Gln | CAA<br>Gln | AGC<br>Ser | 576  |
| 180        |            |            |            |            | 185        |            |            |            |            | 190        |            |            |            |            |            |      |
| GAT<br>Asp | TTA<br>Leu | GAA<br>Glu | CAA<br>Gln | GAG<br>Glu | AGA<br>Arg | CGT<br>Arg | GCT<br>Ala | AAA<br>Lys | GAA<br>Glu | AAG<br>Lys | TTG<br>Leu | CAA<br>Gln | GAG<br>Glu | CAG<br>Gln | CAA<br>Gln | 624  |
| 195        |            |            |            |            | 200        |            |            |            |            | 205        |            |            |            |            |            |      |
| AGA<br>Arg | GAT<br>Asp | TTA<br>Leu | GAA<br>Glu | CAA<br>Gln | AGG<br>Arg | AAG<br>Lys | GCT<br>Ala | GAT<br>Asp | ACG<br>Thr | AAA<br>Lys | AAA<br>Lys | AAT<br>Asn | TTA<br>Leu | GAA<br>Glu | AGA<br>Arg | 672  |
| 210        |            |            |            |            | 215        |            |            |            |            | 220        |            |            |            |            |            |      |
| AAA<br>Lys | AAG<br>Lys | GAA<br>Glu | CAT<br>His | GGA<br>Gly | GAT<br>Asp | ATA<br>Ile | TTA<br>Leu | GCA<br>Ala | GAG<br>Glu | GAT<br>Asp | TTA<br>Leu | TAT<br>Tyr | GGT<br>Gly | CGT<br>Arg | TTA<br>Leu | 720  |
| 225        |            |            |            |            | 230        |            |            |            |            | 235        |            |            |            |            | 240        |      |
| GAA<br>Glu | ATA<br>Ile | CCA<br>Pro | GCT<br>Ala | ATA<br>Ile | GAA<br>Glu | CTT<br>Leu | CCA<br>Pro | TCA<br>Ser | GAA<br>Glu | AAT<br>Asn | GAA<br>Glu | CGT<br>Arg | GGA<br>Gly | TAT<br>Tyr | TAT<br>Tyr | 768  |
| 245        |            |            |            |            | 250        |            |            |            |            | 255        |            |            |            |            |            |      |
| ATA<br>Ile | CCA<br>Pro | CAT<br>His | CAA<br>Gln | TCT<br>Ser | TCT<br>Ser | TTA<br>Leu | CCT<br>Pro | CAG<br>Gln | GAC<br>Asp | AAC<br>Asn | AGA<br>Arg | GGG<br>Gly | AAT<br>Asn | AGT<br>Ser | AGA<br>Arg | 816  |
| 260        |            |            |            |            | 265        |            |            |            |            | 270        |            |            |            |            |            |      |
| GAT<br>Asp | TCC<br>Ser | AAG<br>Lys | GAA<br>Glu | ATG<br>Met | TCT<br>Ser | ATA<br>Ile | ATA<br>Ile | GAA<br>Glu | AAA<br>Lys | ACA<br>Thr | AAT<br>Asn | AGA<br>Arg | GAA<br>Glu | TCT<br>Ser | ATT<br>Ile | 864  |
| 275        |            |            |            |            | 280        |            |            |            |            | 285        |            |            |            |            |            |      |
| ACA<br>Thr | ACA<br>Thr | AAT<br>Asn | GTT<br>Val | GAA<br>Glu | GGA<br>Gly | CGA<br>Arg | AGG<br>Arg | GAT<br>Asp | ATA<br>Ile | CAT<br>His | AAA<br>Lys | GGA<br>Gly | CAT<br>His | CTT<br>Leu | GAA<br>Glu | 912  |
| 290        |            |            |            |            | 295        |            |            |            |            | 300        |            |            |            |            |            |      |
| GAA<br>Glu | AAG<br>Lys | AAA<br>Lys | GAT<br>Asp | GGT<br>Gly | TCA<br>Ser | ATA<br>Ile | AAA<br>Lys | CCA<br>Pro | GAA<br>Glu | CAA<br>Gln | AAA<br>Lys | GAA<br>Glu | GAT<br>Asp | AAA<br>Lys | TCT<br>Ser | 960  |
| 305        |            |            |            |            | 310        |            |            |            |            | 315        |            |            |            |            | 320        |      |
| GCT<br>Ala | GAC<br>Asp | ATA<br>Ile | CAA<br>Gln | AAT<br>Asn | CAT<br>His | ACA<br>Thr | TTA<br>Leu | GAG<br>Glu | ACA<br>Thr | GTA<br>Val | AAT<br>Asn | ATT<br>Ile | TCT<br>Ser | GAT<br>Asp | GTT<br>Val | 1008 |
| 325        |            |            |            |            | 330        |            |            |            |            | 335        |            |            |            |            |            |      |
| AAT<br>Asn | GAT<br>Asp | TTT<br>Phe | CAA<br>Gln | ATA<br>Ile | AGT<br>Ser | AAG<br>Lys | TAT<br>Tyr | GAG<br>Glu | GAT<br>Asp | GAA<br>Glu | ATA<br>Ile | AGT<br>Ser | GCT<br>Ala | GAA<br>Glu | TAT<br>Tyr | 1056 |

| 340 |     |     |     |     |     | 345 |     |     |     |     |     | 350 |     |     |     |  |  |      |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|------|
| GAC | GAT | TCA | TTA | ATA | GAT | GAA | GAA | GAA | GAT | GAT | GAA | GAC | TTA | GAC | GAA |  |  | 1104 |
| Asp | Asp | Ser | Leu | Ile | Asp | Glu | Glu | Glu | Asp | Asp | Glu | Asp | Leu | Asp | Glu |  |  |      |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |  |  |      |
| TTT | AAG | CCT | ATT | GTG | CAA | TAT | GAC | AAT | TTC | CAA | GAT | GAA | GAA | AAC | ATA |  |  | 1152 |
| Phe | Lys | Pro | Ile | Val | Gln | Tyr | Asp | Asn | Phe | Gln | Asp | Glu | Glu | Asn | Ile |  |  |      |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |  |  |      |
| GGA | ATT | TAT | AAA | GAA | CTA | GAA | GAT | TTG | ATA | GAG | AAA | AAT | GAA | AAT | TTA |  |  | 1200 |
| Gly | Ile | Tyr | Lys | Glu | Leu | Glu | Asp | Leu | Ile | Glu | Lys | Asn | Glu | Asn | Leu |  |  |      |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |  |  |      |
| GAT | GAT | TTA | GAT | GAA | GGA | ATA | GAA | AAA | TCA | TCA | GAA | GAA | TTA | TCT | GAA |  |  | 1248 |
| Asp | Asp | Leu | Asp | Glu | Gly | Ile | Glu | Lys | Ser | Ser | Glu | Glu | Leu | Ser | Glu |  |  |      |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |  |  |      |
| GAA | AAA | ATA | AAA | AAA | GGA | AAG | AAA | TAT | GAA | AAA | ACA | AAG | GAT | AAT | AAT |  |  | 1296 |
| Glu | Lys | Ile | Lys | Lys | Gly | Lys | Lys | Tyr | Glu | Lys | Thr | Lys | Asp | Asn | Asn |  |  |      |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |  |  |      |
| TTT | AAA | CCA | AAT | GAT | AAA | AGT | TTG | TAT | GAT | GAG | CAT | ATT | AAA | AAA | TAT |  |  | 1344 |
| Phe | Lys | Pro | Asn | Asp | Lys | Ser | Leu | Tyr | Asp | Glu | His | Ile | Lys | Lys | Tyr |  |  |      |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |  |  |      |
| AAA | AAT | GAT | AAG | CAG | GTT | AAT | AAG | GAA | AAG | GAA | AAA | TTC | ATA | AAA | TCA |  |  | 1392 |
| Lys | Asn | Asp | Lys | Gln | Val | Asn | Lys | Glu | Lys | Glu | Lys | Phe | Ile | Lys | Ser |  |  |      |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |  |  |      |
| TTG | TTT | CAT | ATA | TTT | GAC | GGA | GAC | AAT | GAA | ATT | TTA | CAG | ATC | GTG | GAT |  |  | 1440 |
| Leu | Phe | His | Ile | Phe | Asp | Gly | Asp | Asn | Glu | Ile | Leu | Gln | Ile | Val | Asp |  |  |      |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |  |  |      |
| GAG | TTA | TCT | GAA | GAT | ATA | ACT | AAA | TAT | TTT | ATG | AAA | CTA | TAA |     |     |  |  | 1482 |
| Glu | Leu | Ser | Glu | Asp | Ile | Thr | Lys | Tyr | Phe | Met | Lys | Leu |     |     |     |  |  |      |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     |     |     |  |  |      |

## (2) INFORMATION FOR SEQ ID NO:46:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 12 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (genomic)

## (ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..12

## (x) PUBLICATION INFORMATION:

- (H) DOCUMENT NUMBER: WO 92/13884
- (J) PUBLICATION DATE: 20-AUG-1992

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:46:

AAG GTT ATA TAT  
Lys Val Ile Tyr  
1